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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,252	01/23/2004	Yang Wang		8020

7590 08/24/2004  
YANG WANG  
7 Black Bear Lane  
WESTFORD, MA 01886

EXAMINER

VANORE, DAVID A

ART UNIT PAPER NUMBER

2881

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/764,252	WANG, YANG	
	Examiner	Art Unit	
	David A Vanore	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-63 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____.  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.   | 6) <input type="checkbox"/> Other: ____.                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

This application contains claims directed to the following patentably distinct species of the claimed invention:

Species I: Claim 1 requiring a three-dimensional rotationally symmetric ring electrode and two cap electrodes with surfaces facing toward the inside of the ion trap, said two cap electrodes being further composed of a plurality of component electrodes, the surfaces of said ring electrode and cap electrodes being shaped to reduce nonlinearity; means for generating a time-varying, substantially quadrupole field, said means further compensating the nonlinearity induced quadrupole field distortion; means for ions mass analysis, said means utilizing the nonlinearity for providing higher mass resolving power.

Species II: Claim 2 requiring a rotationally symmetric ring electrode cut, in parallel to its central axis, into an even number, equal or larger than four, of equal parts and two cap electrodes with surfaces facing toward the inside of the ion trap, said two cap electrode being further composed of a plurality of component electrodes, the surfaces of said ring electrode and cap electrodes being shaped to reduce nonlinearity; means for electrically operating said even number of equal parts to switch said ion trap operation between a three-dimensional mode and a two-dimensional mode; means for

Art Unit: 2881

generating a time-varying, substantially quadrupole field, said means further compensating the nonlinearity induced quadrupole field distortion when said ion trap operating under the three-dimensional mode; means for generating a linear RF multipole field when said ion trap operating under the two-dimensional mode.

Species III: Claims 3, 29, 33, 37, 41, 42, 43, 47, 48, and 49 requiring a three-dimensional, rotationally symmetric ring electrode and two cap electrodes with hyperbolic surfaces facing toward the inside of said ion trap, each of said two cap electrodes being further composed of a first hyperbolic cone electrode and a second disk electrode, a RF or periodic circuitry constructed and arranged for applying a RF or periodic voltage to said ring electrode to generate a main quadrupole field in said ion trap; an AC circuitry constructed and arranged for applying an AC voltage to said disk electrodes of said two cap electrodes to generate a dipole field in said ion trap; a DC circuitry constructed and arranged for applying an DC voltage to said cone electrodes of said two cap electrodes to generate an electrically variable electrostatic octopole field in said ion trap.

Species IV: Claims 4-7, 30, 34, 38, 44, and 50-52 requiring a three-dimensional, rotationally symmetric ring electrode and two cap electrodes, the surface of each one of the cap electrodes consists of first portion of spherical surface and a second portion of cone surface; the cross-sectional surface of the ring electrode consists of a

Art Unit: 2881

portion of circle and two straight lines jointed in orthogonal to the circle; the surfaces of the two cap electrodes facing toward the inside of said ion trap.

Species V: Claims 8-15, 31, 35, 59, 45, and 53-55 requiring two trapping plates located in the two terminals of the ion trap device; a set of four predetermined surface-shaped rods located in the center; a set of electrodes located between the set four predetermined surface-shaped rods; a control circuitry for applying a predetermined voltage to said two trapping plates.

Species VI: Claims 16-28, 32, 36, 40, 46, and 56-58 requiring a three-dimensional rotationally symmetric ring electrode and two cap electrodes, the ring electrode being divided, in parallel to its central axis, into a plurality of even number of component electrodes, said component electrodes being electrically isolated from each other, the surfaces of the two cap electrodes facing toward the inside of said ion trap, a mechanism constructed and arranged for switching said ion trap to operate between a three-dimensional quadrupole ion trap mode and a two-dimensional linear ion trap mode.

Species VII: Claims 59-60 requiring a three-dimensional ion trap, said ion trap being sealed within a vacuum chamber, said vacuum chamber has vacuum in the range between  $10^{-2}$  to  $10^{-1}$  mbar.

Art Unit: 2881

Species VIII: Claim 61 requiring a set of cap electrodes, each of said cap electrodes being further divided into a predetermined number of component electrodes having predetermined shape, a DC circuitry constructed and arranged for applying an DC voltage to a pair of said component electrodes of said cap electrodes to generate an independent electrically variable electrostatic octopole field in said ion trap.

Species IX: Claims 62-63 requiring a ring electrode, the ring electrode being divided, in parallel to its central axis, into a plurality of even number of component electrodes, said component electrodes being electrically isolated from each other; a mechanism constructed and arranged for switching said ion trap to operate between a three-dimensional quadrupole ion trap mode and a two-dimensional linear ion trap mode.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include

Art Unit: 2881

all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

### ***Conclusion***

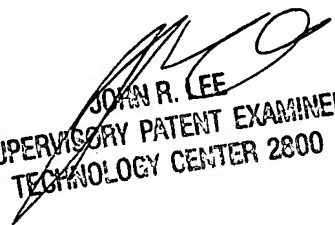
Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A Vanore whose telephone number is (571) 272-2483. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2881

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dav

  
JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800